

# Shotgun recoil causing severe acute aortic regurgitation years after replacement of the aortic valve and ascending aorta

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## ABSTRACT

Blunt chest trauma can lead to severe, life-threatening injury to chest organs, including the aorta, heart, lungs, and major airways. We describe a 64-year-old man who had undergone replacement of his aortic valve and ascending aorta 14 years earlier (at age 50) and suddenly developed severe aortic regurgitation after firing his shotgun while hunting. Such an event has not been reported previously.

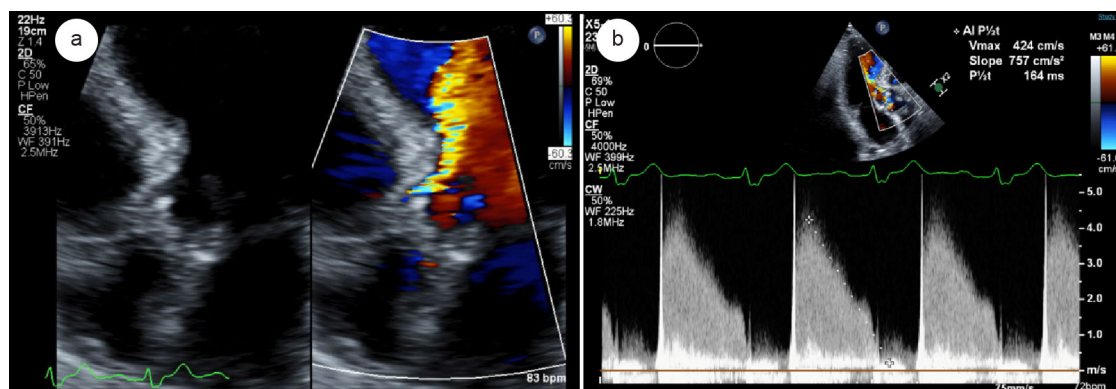
**KEYWORDS** Aortic regurgitation; bioprosthetic aortic valve replacement; echocardiography; shotgun recoil; trauma

Shotgun recoil as the cause of acute severe aortic regurgitation has not been reported previously. Such was the case, however, in a hunter described herein.

## CASE PRESENTATION

A 64-year-old man who had undergone a bioprosthetic replacement of his aortic valve and ascending aorta at age 50 developed acute chest pain and dyspnea shortly after shooting his 20-gauge shotgun. Examination 2 days later disclosed a blood pressure of 140/45 mm Hg and a precordial grade 4/6

diastolic murmur with water-hammer pulse. Electrocardiogram showed sinus rhythm with first-degree atrioventricular block, left axis deviation, and a right bundle branch block. A computed tomographic angiogram showed no aortic dissection or pulmonary embolus, but did show mild pulmonary edema. Troponin I assay was 1.12 ng/mL (reference range 0–0.05 ng/mL). B-type natriuretic peptide was 740 pg/mL (reference range 0–100 pg/mL). A transthoracic echocardiogram showed a thickened St. Jude bioprosthetic valve in the aortic valve position and severe aortic regurgitation (*Figure 1*). A transesophageal

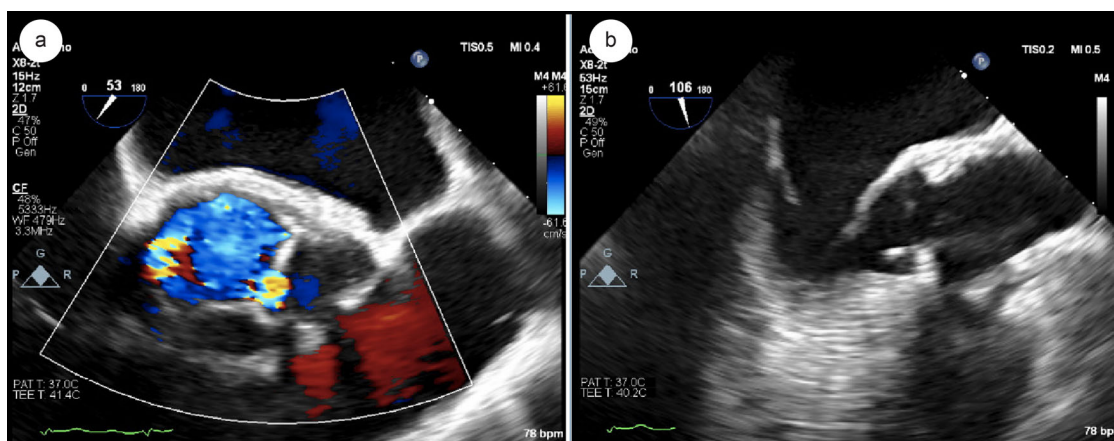


**Figure 1.** Transthoracic echocardiogram. (a) Five-chamber view showing flail leaflet with eccentric severe aortic regurgitation by Doppler. (b) Three-chamber view with pressure half time of 164 ms.

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The authors report no conflicts of interest. Consent was obtained from the patient for publication of this case.

Received August 3, 2021; Revised September 14, 2021; Accepted September 16, 2021.



**Figure 2.** Transesophageal echocardiogram. (a) Mid-esophageal aortic valve short axis view showing severe aortic valve insufficiency. (b) Mid-esophageal aortic valve long axis view showing flail noncoronary aortic valve leaflet.



**Figure 3.** The operatively excised bioprosthesis showing total detachment of one cusp at one commissure and partial detachment at the other two commissures causing severe bioprosthetic regurgitation. (a) Surgeon view of the bioprosthetic aortic valve. (b) Ventricular aspect of the aortic valve.

echocardiogram confirmed severe transvalvular bioprosthetic aortic regurgitation with no left ventricular systolic dysfunction (Figure 2).

He underwent replacement of the bioprosthesis with a 25 mm Edwards bovine pericardial valve (Inspiris Resilia) and bypass grafting to the right coronary artery. At replacement, the noncoronary bioprosthetic cusp had two perforations and was torn at the commissure between the right and noncoronary cusps (Figure 3). At 20-month follow-up, the patient had no complaints and had returned to baseline activities.

## DISCUSSION

Currently, there are no reports suggesting that those with underlying valve abnormality or prior valve replacement are at increased risk of acute valvular damage after blunt chest trauma.<sup>1-4</sup> Thus, the case presented is unique. Shotgun

recoil to the chest needs to be considered as a cause of traumatic acute aortic regurgitation.

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